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ABSTRACT

This paper briefly reviews the first large-scale use of computer mediated communication (CMC) at the Open University (OU) in Milton Keynes, England, including computer conferencing and electronic mail, in an adjunct mode on a multimedia distance education course with 1,500 students. The first part of the paper outlines the rationale for introducing CMC into the distance education situation in terms of the use of the medium for regular updating of a course, and for increasing the opportunities for interaction amongst and between students, tutors, and course developers. It then goes on to describe OU's growing electronic campus as a virtual environment where members of the university community can meet, socialize, collaborate, and learn. The second part of the paper looks at the effects and implications of the use of computer conferencing within an OU course, with specific reference to the roles of the course team, teachers, and students. In particular, it asks to what extent CMC as a medium can empower students and teachers in the distance learning environment, i.e., give them a stronger role in the educational process and an enhanced opportunity to contribute and share their own knowledge and experience as adult learners. A list of 98 reports from the Centre for Information Technology in Education completes the document. (17 references) (Author/DB)

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COMPUTER CONFERENCING AND MASS DISTANCE EDUCATION (1)

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Abstract

This paper briefly reviews the first large-scale use of computer-mediated communication (CMC), including computer conferencing and electronic mail, in an adjunct mode on a multi-media distance education course with large numbers of students. The course in question is a 400-hour second year undergraduate course at the British Open University, with annual enrolments of around 1500 students, and involving 70 part-time tutors. The course is a multi-disciplinary one , covering the social and technological aspects of the use of new information technologies.

The first part of the paper outlines the rationale for introducing CMC into the distance education situation, specifically in terms of the use of the medium for regular updating of a course, and for increasing the opportunities for interaction amongst and between students, tutors, and course developers. It then goes on to describe the Open University's growing 'electronic campus', a virtual environment where central and regional university staff, tutors, students, alumni, and other members of the university's dispersed community can meet, socialise, collaborate, and learn from each other.

The second part of the paper looks at the effects and implications of the use of computer conferencing within an Open University course, with specific reference to the roles of the course team, the tutors, and the students. In particular, it asks to what extent CMC as a medium can 'empower' students and tutors in the distance learning environment - namely, give them a stronger role in the educational process, and an enhanced opportunity to contribute and share their own knowledge and experience as adult learners.

(1) to appear in Waggoner, M. (ed) *Empowering Networks: Using Computer Conferencing in Education*

Old and new media in distance education

Distance education systems, which provide instruction to large numbers of students spread over wide geographical areas, characteristically use a range of different media and teaching methods, each associated with particular learning goals. For example, specially written print materials, designed to encourage active participation by the reader, and to allow a variety of reading strategies, are generally used to convey the principal academic content of a course. Television broadcasts may be used to demonstrate scientific experiments, to visualise dynamic processes, or to convey primary source materials of a visual nature, whereas live radio broadcasts often serve feedback and magazine functions. Contact with tutors and other students, at face-to-face meetings or over the telephone, is generally the occasion for discussing learning difficulties related to particular concepts in the course, for analysing homework assignments, or for carrying out group learning activities. Correspondence tuition provided by tutors to individual students is usually focussed on assignment work submitted for grading purposes. Other media traditionally used in the distance education context (eg audiocassettes, videocassettes, CAL software) each have their specific role to play in what is generally a carefully orchestrated educational composition.

A major drawback to many distance education programmes is the relatively 'inert' nature of the courses - especially when these consist of expensively produced integrated multi-media materials (e.g videotapes, texts, CAL software, broadcasts etc). Up-dating and changing of such courses in the light of new research and perspectives is costly, and indeed many distance education courses are designed to be re-run over periods of 6-10 years in essentially their original form, thus amortising high course development costs over an extended period of time. The changes that an individual classroom teacher might make in response to student needs and new developments in the field become impossible in a standard distance education course. Another problem common to traditional distance education is the lack of opportunity for dialogue, debate, conversational learning, and collaborative work. Much emphasis is thus placed on the *personal* motivation and self-reliance of the individual student, who lacks the many occasions for interactive discussion, argument, and group activity that characterises any good face-to-face educational situation involving mature adult learners. Furthermore, tutors are often employed primarily as mediators of the packaged course materials, and as evaluators of individual student's work, rather than as facilitators of group-based learning processes.

It could be argued that the new information technologies which involve selective interactivity (giving learners access to computer-based and easily up-dated sources of information) and full interactivity (communication with other learners and with tutors) will help remedy these drawbacks (Henri,

1988), and give students and tutors a more central role in the educational process. *A priori*, it would seem that the increasingly widespread computer-based communications media should be able to bring a new, interactive, convivial, and collaborative dimension into the traditionally very individual, even solitary, distance learning experience (see, for example, Lamy, 1985).

Asynchronous computer-based messaging and other forms of computer-mediated communication could, theoretically, play a major role in enhancing the quality of distance education, precisely by empowering the students and tutors, and giving them a more active and participatory role in the educational process. Evidence from trials of computer conferencing within a traditional teacher-centred educational paradigm (the 'virtual classroom', the 'online graduate seminar') suggests that students and teachers can replicate electronically the dialogue that occurs in the face-to-face class, and that in some respects (eg increased levels of turn-taking by students) this electronic dialogue may be even richer (Hiltz, 1986; Harasim, 1987). Thus it should be possible to use computer conferencing in conjunction with other, more traditional, distance education media, to give a stronger voice to students and tutors in distance education programs.

Features of computer-mediated communication (CMC) which seem particularly adapted to the distance education situation include:

- the overcoming of space, time, and access constraints to communication amongst students and tutors: any one user can conveniently find and contact any other users of the network, in a way which is virtually impossible using traditional communication methods
- the convenience of a store and collect technology for message handling: texts can be sent and read at times chosen by each individual user
- the text-based nature of the medium (as opposed to voice or audio-visual communication), which is consonant with the skills of textual analysis and composition which are key features of the distance learner's repertoire
- the central storage of all text, so that messages or parts of messages can be retrieved at will at a later date, and used in a variety of ways (eg text can be down-loaded and edited into other documents, written comments from fellow-students or a tutor can be incorporated into an ongoing piece of work, the text of a conference can be subsequently edited to produce a report)
- the facility for group communication, which could be used for self-help activities amongst students, for co-operative learning, for on-line seminars, and for team-work in creation of project documents and assignments.

This chapter attempts to present an initial analysis of the effects of providing computer conferencing technology to over 1000 students and 70 tutors on a multi-media distance education course at the Open University in Britain. It examines, specifically, the extent to which the inclusion of an 'electronic campus' in a mass audience distance education course can be said to 'empower' the students and tutors, and the ways in which the use of computer communications technology has modified the relationship between course developers, students, and tutors..

The Open University's 'electronic campus'

When the Open University decided to proceed with a major implementation of a computer-mediated communication system for one of its high population undergraduate courses, a review of available software led to the choice of the CoSy conferencing system, developed at the University of Guelph in Ontario. CoSy thus forms the basis of the University's national 'electronic campus'.

The CoSy conferencing system

The operation of CoSy can be explained from the user's point of view through the metaphor of the writer's desk (see figure 1). This metaphor is particularly appropriate to the distance learner's situation - it emphasises CMC as a medium of written discourse (correspondence has always been the lifeblood of distance learning), but it also shows the different types of written communication that are possible, and hints at how the central computer stores and structures information pertaining to users and to conferences, thus promoting a far more active and extensive form of communication than traditional correspondence.

The main features of the CoSy system include:

- Electronic mail, with separate 'baskets' for different categories of mail (new mail, held mail, acknowledged mail)
- Conferences, which can be 'read only' (ie essentially for posting notices) or 'read/write' (for collaborative discussion), open or closed, confidential (ie unlisted) or public (details appear in a public conference directory); a given conference may have several 'topics' each one set up by the conference moderator; messages in conferences can be searched in various ways, and the system provides information on the status of each conference (numbers of read and unread messages, date and time when each member last accessed the conference etc.)
- 'Conversations', which are single topic group discussion areas designed for informal communication - any user can set up a conversation, and any

member of a conversation can join any other member of CoSy to it; conversations are not publicly listed, do not have moderators, and the messages auto-destruct when the last member resigns

• A 'scratchpad' area for preparing and editing message texts on-line, although the use of PC's and local editors means that many users prepare their contributions off-line, before connecting to the system and uploading them

• A directory of users, containing the personal resumés prepared and uploaded by each user, as well as their last log-on date; the directory can be searched by inputting a name string

• A conference directory, also searchable, listing the title, a brief description, and the status of every public conference.

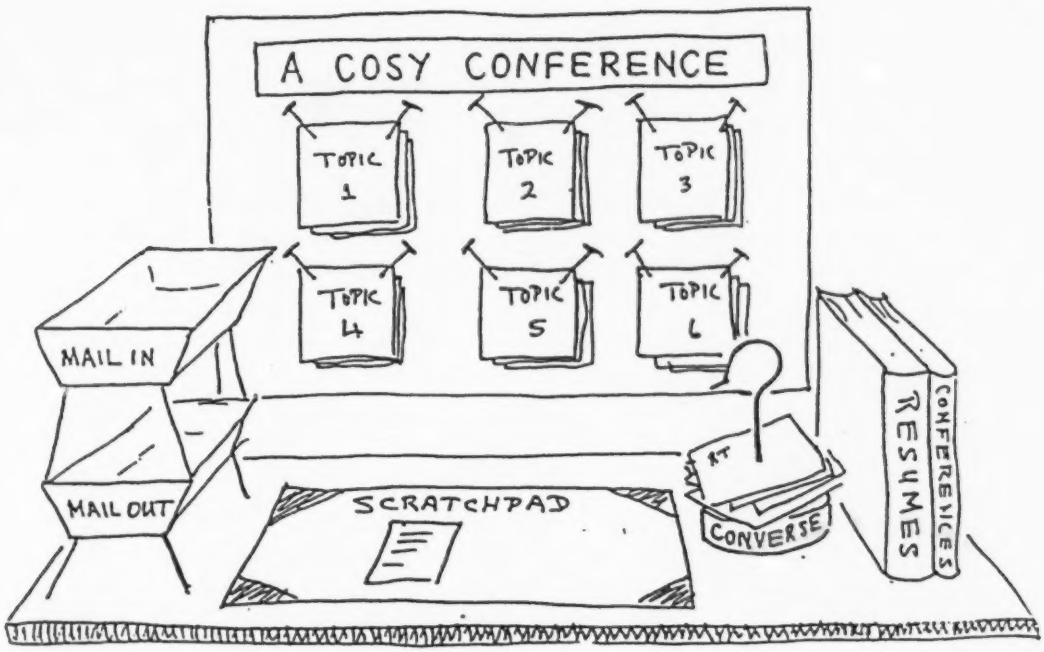

Figure 1: A Metaphor for CoSy (courtesy of Ray Thomas, Open University)

The Open University's national computer network

CoSy runs on the Academic Computing Service's VAX cluster at Milton Keynes, where the University's academic and administrative headquarters is based, and is accessible from anywhere in the country. The Open University is a national institution, catering for over 100,000 home-based adult students throughout Britain. Local support (eg tuition, counselling) for students is organised through 13 Regional Centres and 3 sub-offices throughout the country. Each of these sites houses dial-up multiplexor nodes which are connected to the VAX cluster in Milton Keynes via leased lines. Staff in the regional centres can use terminals or PC's from their offices to connect to the VAX cluster. Students and part-time tutors throughout the country who have ID's on the system can telephone their nearest dial-up node and be connected through to CoSy, paying only the cost of the phone call to that node. Unfortunately, students living outside the local dial-up range of a node pay long-distance telephone charges - they are in fact doubly disadavantaged, as they also tend to have to travel furthest to study centres for face-to-face tutorials.

The first inhabitants of the electronic campus

The CoSy system was installed at the Open University primarily for use on the second-year undergraduate course *An Introduction to Information Technology: Social and Technological Issues* [course code DT200]. This is one of over 120 undergraduate courses, and the only one currently using computer communication an any scale. It is a popular course, with annual enrolments of around 1500 students. The course was first offered in 1988, and is now entering its third year of presentation. It is a standard multi-media OU course in many respects, with print, audio-visual, and face-to-face components. However, about 25% of the student's estimated 400 hours study time is spent on practical work activities, using a PC at home. These activities include learning to use word-processor, communications, spread-sheet and data-base software, as well as a notional 10 hours connect time throughout the year on CoSy.

CoSy is presented to the students taking DT200 as providing an 'electronic campus' (see Figure 2) where they can go to the 'Mail Building' to collect and send their mail, socialise with other students in the 'conversation area', and take part in formal on-line tutorials (in local tutor group and regional conferences) in the 'Tutorial Building'. Other buildings on this virtual campus include a 'Training Centre' (where students can learn how to use CoSy), a 'Student Union' with a forum conference to which all students, tutors, and course team members can contribute, and an 'Information Centre' where urgent notices from the course team are posted in a 'news' conference.

Figure 2: The DT200 Electronic Campus
(from DT200: *An Introduction to Information Technology: Social and Technological Issues*, Block 2, Part D, c Open University, 1988)

There is also a 'Records Office', where students can look up other CoSy users' resumés, and scan the list of public conferences. Not shown on the map is a 'Senior Common Room', which is a restricted, unlisted conference open only

to tutors and course team members. This is the place where tutors provide feedback to the course team, make proposals for improvements to the course, and discuss assessment issues. Current students also have the chance to get in touch with, and obtain advice and guidance from, DT200 'alumni', who took the course in previous years, and who have asked to be able to keep their ID's on CoSy. This type of peer teaching and help is not normally possible on conventional OU courses.

The top left-hand end of the campus map indicates that students on DT200 can, if they wish, spend time in reading and contributing to other (non-course) conferences on CoSy, as the early residents of the campus include a small number of central and regional staff who have taken up this new medium with enthusiasm. In mid-1989, there were around 100 open conferences on CoSy, on topics ranging from the USSR and China to film reviews, writing in French, the latest Macintosh software, and the quality of life in Milton Keynes. There is even a collectively authored spy novel which is now several hundred pages long. A small but growing number of overseas campus personalities (including students living abroad, and academics and researchers from France, the USA, Canada, Denmark, Australia, and the USSR) bring an international dimension to the growing electronic community.

Altogether, at the present time, there are over 450 group conferences and conversations on the OU's CoSy system, about half of which are currently active. The total numbers of messages in these conferences and conversations exceeds 29,000, whilst nearly 100,000 email messages have been written since CoSy became operational in 1987.

It is not the intention to present here a systematic evaluation of computer conferencing at the Open University, and, in any case, it is too early yet to make any conclusive judgements. The use of CoSy by students and tutors on the DT200 course in its first year of presentation is analysed by Mason (1989a). She concludes by saying that : "*...for the majority students, tutors, and course team members, computer conferencing was an interesting but marginal activity, For the committed or 'converted' minority, however, there is little doubt that this medium was an exciting, innovative, and satisfying way of participating in distance teaching and learning*".

The remainder of this chapter reviews some of the effects of the introduction of the CoSy conferencing system on the three major consituencies involved in an Open University course: namely the course team, the tutors, and - finally, and most importantly - the students. This review is based on the experience with the course DT200, already mentioned above.

The course team

Open University courses are developed and produced by course teams made up of academic specialists from the appropriate faculties, external consultants and assessors, radio and television producers, educational technologists, and editors. Responsibility for the overall direction of the team's work is invested in a course chair, generally one of the full-time central faculty staff, and day-to-day scheduling and organisation is carried out by a course manager. One or more regionally-based staff tutors on the team will generally play a key role in developing ideas for tutorial support and for the recruitment and training of the part-time tutors who will be responsible for grading students' work and for running tutorials once the course has started.

The activities of a course team can be divided into two major phases - course production and course presentation. The course production phase may last up to three years, and is the period during which the course develops from an initial outline to a completed package of print, audio-visual material, and software, at a production cost of the equivalent of about 1 million US$ per course.(1) The considerable scale and cost of the course production operation at the Open University only hints, of course, at the intellectual challenge and conceptual complexity of developing the academic structure and content of a multi-disciplinary course which attempts to bring together a treatment of the social, technological, and practical issues underlying the use and understanding of new information technologies. The DT200 production course team included amongst its members sociologists, economists, psychologists, educational researchers, and academic experts in computing, electronics, and telecommunications. It was no small achievement to obtain consensus on the main themes of the course and the ways in which they should be treated, despite regular fortnightly and monthly team meetings over a two-year period.

Once the materials for an Open University course have been produced, the original course team is disbanded, and a small 'maintenance' team is established for the 5 - 8 year period over which the course is presented. Each year during this course life, a new cohort of students studies the course, and course tutors take responsibility for tutorials and for evaluation of students' homework assignments. Each tutor is responsible for 20 - 25 students, and most tutors will stay with a course, helping a different group of students in their locality each year. The normal responsibilities of the maintenance course team include :

- making minor changes and improvements to the course structure and materials each year, based on feedback from students and tutors
- re-writing the assignment and examination materials each year
- monitoring tutors' marking of assignments, and organising the marking of end-of-year examination papers.

How has the introduction of computer conferencing changed the ways in which the course team works? *A priori*, one would have thought that the DT200 production course team would have been an ideal candidate for the use of computer conferencing for administrative purpses, and for progressing decisions and discussion of drafts of course materials in between the regular face-to-face meetings of the team. After all, the team had taken a collective decision to include computer conferencing as an integral part of the course for students and tutors, most members of the team used word-processing software for writing drafts of their material, and modems, comms software, technical backup, and re-imbursement of connect charges for home-based users were all available. Furthermore, it often proved difficult to organise face-to-face meetings of course sub-groups at times that were convenient to all members: many of the full-time faculty were involved in other academic and administrative duties, and some of the team contributors were external consultants. So all the necessary conditons for effective use of computer conferencing for academic collaboration and administration seemed to be reunited in the team (2).

However, the fact is that only a few members of the team used CoSy at all during the course production phase, and this use was mainly restricted to online discussions of the future role of CMC in the course, by a small number of proponents of this technology on the team. With the benefit of hindsight, it is easy to list the reasons why CMC was not used significantly during the course production phase as a working tool, even though special conferences were set up on CoSy to discuss different parts and blocks of the course:

- during the production period (essentially 1986 and 1987) both the campus network and the national dial-up network were being upgraded, and very few academic staff on the course team had developed the habit of using even electronic mail, let alone conferencing, as working tools
- it would have been very difficult to have got *all* the members of the course team using CoSy on a regular basis during this period, hence any items posted onto the different block working conferences on CoSy, or any material sent to team members via email, had to be duplicated via the traditional channels of paper memos and face-to-face meetings
- pressure on staff to complete their contributions on schedule were particularly severe, given the complexity of the course and its inter-disciplinary nature; as a result, many course team members felt they did not have time to learn how to use CMC (and were probably not convinced that, having learnt to use it, it would save them time!)
- many course team members may well have been sceptical about whether CMC could actually improve on well-tried course production methods, and some might have been reluctant to invest time in a medium (computer conferencing) which would be liable to lead to protracted discussion of drafts of course material, and hence more work for

individual authors in taking on board colleagues' comments.

The lack of interest in CoSy during the course production phase is reflected in the minutes of the regular production course team meetings, which contain only occasional references to the use of CMC on the course. However, the records of the meetings of the course *maintenance* team, set up once the course went live, contain an increasing number of references to CoSy, and during the second year of presentation of the course (1989), CMC-related issues became the main items of concern and attention. A number of reasons can be given for the growing significance attached to CMC by the presentation course team, despite the relatively small amount of time which students are expected to spend online (10-20 hours out of a total of about 400 hours):

- during the first year of the course, CoSy quickly became an invaluable and extremely rapid channel for students and tutors to notify problems to the course team; special conference topics were set up on CoSy for reporting problems with software, equipment, the network, and with the print materials (errata, delayed mailings etc), and other tutors and students, as well as members of the maintenance course team and the University's Academic Computing Service, could often provide answers through the same channel
- some members of the course team who had contributed to the print and broadcast materials used a national *forum* conference on CoSy for running discussions on their parts of the course, as well as for up-dating the material; although only a minority of students contributed messages, a large proportion accessed and read the ensuing discussions
- students are required to complete a written project on computer-mediated communication as part of their coursework, and two of the other assignments involve work related to CMC, so course team discussions concerning assignments invariably cover the use of CoSy
- as the maintenance course team, and especially the course manager, became more at ease with CMC, the value of CoSy as a general course maintenance tool became increasingly apparent, not only for getting rapid feedback from students, but also for involving correspondence tutors and staff tutors, scattered all over the country, in decisions about revisions to the course, about preparation and grading of assignment and examination questions, and in general central-regional coordination
- apart from the course assignments, CoSy is the only component of the course that can be changed from year to year, and is the only one which can be modified *within* a given presentation year, so there is a constant pre-occupation with ways of using this flexibility to improve the course.

In conclusion, another factor which has influenced the increasing use of CoSy by the maintenance course team is the fact that it is largely composed of people who were not only committed to the teaching of the course, but were

also favourably disposed to CMC from the start.

The tutors

Tutors in the Open University system are, in a sense, mediators of the material prepared by the central course team - their role is to help students in learning from the materials, through face-to-face tutorials, telephone contact, and written comments on students' monthly coursework assignments. They are also required to assess and grade their students' work, so a formal judgemental role has to be combined with that of learning facilitator.

Tutors are recruited and supported locally by full-time staff tutors, who are faculty members based in the University's 13 Regional Offices. Each tutor is responsible for 20-25 students in his or her locality, and will meet these students at occasional evening tutorial or day schools, as well as grade their coursework. Each tutor on a 400-hour full credit course in the Open University programme is generally allocated about 14 hours for giving face-to-face tutorials, and will have maybe seven assignments to mark throughout the year (theoretically each one involving 20-25 scripts to mark) so the work is part-time. Many tutors, however, especially during the first year of a course, will spend far more time on helping their students than the notional times for which the University pays them.

At the beginning of the first year of presentation of a course, new tutors generally attend a briefing meeting given by the course team and staff tutors. A de-briefing might also be organised at the end of the first year. During the year, especially on high-population courses which might have six or more tutors in a given region, day schools and briefing meetings might be arranged by staff tutors at regional offices. And samples of every tutor's marked scripts are selected automatically each month, photocopied, and sent to members of the maintenance course team for monitoring - a procedure designed both to identify severe and lenient tutors, as well as to provide guidance to new tutors on development of their correspondence marking skills. Comments from monitors are sent on to regional staff tutors, whose responsibility it is to take any necessary remedial action.

Apart from the features mentioned above, tutors on Open University courses normally have very little contact with each other, or with the course team, and very rarely meet students outside their own allocated group (unless the course is one of the few with a one-week residential school). Furthermore, as face-to-face tutorials are optional, and some students do not or cannot attend them, a tutor might never meet some of his or her allocated students. About one-third of the 120 undergraduate courses have fewer than 300 students each year, in which case there may only be one tutor per region - on such courses,

because of the wider geographical spread of the students, tutorials cannot be organised very frequently, and there are few chances for a tutor to meet other tutors during the course of the teaching year.

Given the circumstances briefly sketched above, it might be reasonable to assume that CMC could play an important role in reducing tutors' isolation, in increasing their involvement with students and the course team, and in enriching their tutorial role - in short, in empowering them. So what in fact is happening?

DT200, with annual enrolments of up to 1500 students, requires around 70 tutors each year. The course is allocated 14 hours of group tuition time per tutor, generally divided 50/50 between face-to-face tuition and group tuition via CoSy. Tutors are also expected to deal with email messages from their students. In addition to being paid a tuition fee for 14 hours tutorial time, tutors are re-imbursed for up to 20 hours online telephone costs.

Each tutor is moderator of a closed conference on CoSy, which is for the students in his or her tutor group. These tutor group conferences now generally have three or four topics, for chat, for discussion of the coursework assignments and tutorial meetings, and for the course project. During the first year of presentation, they also contained a separate topic for each block of the course (3), but these discussion topics rarely attracted many contributions, presumably because there were never enough active members in each group of 20-25 students. In addition to the local tutor group conferences, each tutor is also a member of one of six regional conferences, each one containing 6-8 tutors and up to 200 students. It is in these regional conferences that the main academic discussion of course themes is carried out on CoSy, within block-related topics. Tutors are expected to contribute to regional conferences on a team teaching basis, organised cooperatively within each regional group.

During the first year of the course, the use of CoSy by tutors was extremely variable - about 30% of the tutors spent less than 10 hours online during the year, and another 30% spent over the 20 hours for which their connect costs were re-imbursed. A few tutors logged on nearly every day, whilst at the other extreme, a handful of tutors did not even fulfill a minimal contractual obligation to log on at least once before the due date for each of the coursework assignments. The picture was similar in the following year (1989), except that the proportion of tutors spending over 20 hours online was reduced to around 22% (this was probably due to a more efficient use of the system, especially in terms of increased offline reading and preparation of messages). The variablity in take-up and use of CoSy by tutors can be attributed to a number of factors:

- differences in attitude to CMC as a medium of communication - it is clear that some tutors adopted the medium enthusiastically, others have a

fairly neutral or cautious attitude, and some dislike it (a similar range of attitudes is to be found amongst students)

- differences in access conditions, in that some tutors had virtually unlimited free access from their own university offices via JANET (the Joint Academic NETwork that links all British universities' computer systems), whilst, at the other extreme, some tutors were logging on from home at long-distance telephone call rates.
- differing levels of prior experience amongst tutors in using computers and computer software.

Tutors used CoSy in different ways. Some felt more at ease using email (eg for sending students comments on their coursework) than conferencing, especially in the first year (Thorpe, 1989). Clearly, one-to-one email is easier to assimilate to familiar communication modes (eg letter-writing) than computer conferencing is to, say, a traditional seminar or tutorial. Many tutors said they could see that conferencing had a great *potential* for group teaching, but only a few felt that they had used the medium satisfactorily in this way within the local or regional conferences, and they tended to be the tutors who are sufficiently enthusiastic about CMC to devote considerable amounts of time to the reading and preparation of messages.

Has CMC 'empowered' the tutors? Some tutors (those who use the network a lot) believe so, for it has given them a chance to get far more involved in the course as a whole than would have been possible without access to CoSy. This increased involvement has taken a number of forms, from giving feedback to the course team in the closed tutors' conference, to contributing their own specialist knowledge to a wider audience than their own student group, and helping re-design the course's electronic environment for 1989. One tutor in 1988 set up a conference topic called *errata* for students and other tutors to post messages about mistakes in the printed course materials, which proved to be a valuable resource for the 1989 version of the course. Other tutors, together with their staff tutors, set up regional conferences to exchange ideas about teaching the course, to swap tips on effective conference moderation, and to organise events such as regional day schools. Tutors who were going to be absent for significant periods during the year were able to arrange for their students to be transferred electronically to another tutor, sometimes in an entirely different region of the country. And some were able to carry on their tutorial work despite being in isolated locations (one tutor who needed to make visits to oil rigs in the North Sea as part of his job was able to log on to CoSy from the rigs and deal with students' queries). And, of course, CMC enables tutors to stay in contact with their students regardless of where they are (one tutor had a student in Hong Kong in his group during 1989, and in 1990 the course is available to students resident in Belgium and Luxembourg)

There is no doubt that if CMC is adopted on a larger scale within the Open

University system, and if it is given a specific tutorial role (in DT200, CoSy was as much an object of study - an example of IT in action - as anything else), then it will inevitably lead to a change in the roles of tutors, and in the nature of their relationship to course team members and staff tutors. Thomas (1989) has pointed out that use of CMC could lead to the introduction of new types of courses at the University, where more resources would be put into online tutoring, and less into the preparation and production of expensive course materials. Such a model would be very appropriate for higher level low population courses, where tutors could rely on students having some level of specialist knowledge to contribute to online seminars and other collaborative activities. He also mentions the idea of an 'electronic region' being established, which would pool the necessary human and logistical resources for courses, students, and tutors. Such a virtual region would, of course, cut across the existing regional organisational structure of the University, but might provide a more appropriate framework for tutors using CMC.

The students

Studying at the Open University is very different from taking courses at a conventional, place-based, institution. The student body is far more heterogeneous, with ages ranging from 19 to 90, and many students are in full-time employment and have domestic and family responsibilities. There are few opportunities for personal contact, discussion, and debate with other students, and normally a student would never meet any of the faculty staff from the course team (unless the latter also happened to be teaching at a residential summer school or day school, or had also taken on a formal tutor role).

The reality of being an Open University student is well described by Ismail (1988), who stresses the need to organise time for study within a busy weekly schedule, to concentrate on the printed course materials, to make sure that monthly course assignments are completed on time, and to prepare for the end of course examination. Face-to-face tutorials and TV and radio broadcasts are often seen as optional luxuries, to be indulged in if time permits. From such a perspective, it might seem that many students would only make limited use of the CMC component in DT200, especially as the initial stages of learning to use the technology can be extremely time-consuming.

Students are introduced to CMC in the second month of the course, and part of the assignment for Block 2 requires them to submit evidence of use of CoSy to their tutor. Furthermore, the course project, work for which is done throughout much of the course, involves planning and writing a report on a chosen aspect of CMC. These factors have generally encouraged most students

(with the exception of the 10% or so each year who drop out) to start to use CoSy, if only at a minimal level, within the first four months of the course. From this point on, the level of use, as for the tutors, is very variable - some students did little more than answer the welcoming email messages from their tutor and the course manager, and, at the other extreme, a small minority became very heavy users. In general, in the first year of the course, about one-third of the students spent less than 3 hours online, one-third between 3-10 hours, and one-third over 10 hours. Students had been advised in the course materials that about 10 hours online time would be sufficient for the required course work on CoSy.

This variability in use of CoSy by students cannot be explained purely by factors such as differences in the amount of time available, differences in access costs (nearly half of the students had to make long-distance calls to a dial-up node), and varying degrees of technical problems. Mason (1989b) points out that the limitations of CMC as a medium, at least as implemented on this course, were a major cause of disappointment amongst medium-to-low users of CoSy during the first year of the course. Many students started off with high expectations of CMC, and felt frustrated and disappointed when they logged on to the system to find very few or no new messages in their local tutor group conference, but large numbers of unread messages in the national conferences. Many of the messages in the large conferences were judged as peripheral, irrelevant, or junk, by many students, who resented spending time and money in accessing and downloading them, and then sorting through the downloaded material to find messages relevant to their own current pre-occupations with the course. And some students did not like the recommended procedure of downloading new messages, reading and preparing comments off-line, and then logging on again to upload their messages, as they felt this reduced the spontaneity and excitement of the medium (even though it saved money on their telephone bill).

This situation improved in 1989, when the six regional conferences were set up, and students and tutors were recommended to use these as the main places for academic discussion of the principal themes and concepts of the course. These provided a larger critical mass of students and tutors for discussion than the local tutor group conferences, without going to the extreme of the national conferences, which *all* students and tutors could join. Analysis of these conferences showed that, on average:

- 15% of students never entered their regional conference (and many of these withdrew from the course, anyway)
- 50% 'lurked' (visited the conference regularly to read new messages, but did not contribute any themselves)
- 35% contributed at least one message
- 5% contributed 5 or more messages.

A content analysis of messages in two of the conferences showed that the

single largest category of messages (40% of total messages) concerned course content and concepts; messages concerning technical and administrative issues formed the next largest category ; about 15% of all messages were 'chat' messages, and messages about CMC as a process totalled also around 15%. This shows an encouragingly low proportion of 'chit-chat' messages (mostly restricted to the chat topic in each regional conference anyway), and a relatively high proportion of messages related to course themes and issues. However, a large proportion of the course-related messages were at the level of information exchange about, and broadening of, the material covered in the course units, typified by sequences of two or three messages in response to a query or problem raised by a student. Occasionally, protracted sequences of messages building on each other, going deeper into specific concepts, and developing into true discussion threads, did emerge, but this was not the typical picture. To put this into perspective, however, one might be inclined to ask how many face-to-face tutorials develop into prolonged interactive and constructive exchanges, bringing significant new depth into the discussion?

CoSy is presented on the DT200 course not only as an object of study, but as a vehicle for tutorial discussion, and as a means of obtaining help from one's tutors and from other students. So students are likely to compare CMC with other, more traditional, channels of communication in making any judgements about the medium, even though it is qualitatively quite different from face-to-face, telephone, or written communication. As part of the course project, students are asked to complete and upload a questionnaire concerning their views on CMC, and there are several questions which ask them to compare CMC with other interactive channels used in distance education. It is interesting to note that, of the 790 students who uploaded their questionnaire data in the middle of the course in 1989, 35% found CMC as good or better a means of getting help or moral support as telephoning their tutor, and 43% could say that CMC was as good or better a medium for intellectual exchange as a face-to-face tutorial. A much smaller percentage (13%), however, rated CMC as being better or as good as face-to-face tutorials as a means of socialising. Such comparisons, although they beg the question of the significance of comparing three qualititatively and structurally dissimilar media of communication, are encouraging in that they show the development of relatively positive attitudes towards CMC after only a very limited exposure to the medium (the questions were answered only 3 months or so after students started to use CoSy).

Has the use of computer conferencing 'empowered' Open University students? One of the questions in the project questionnaire touches on this issue (see Table 1). Students were asked whether they agreed or disagreed with four statements about personal and inter-personal aspects of CMC as a communication medium. Well over half the respondents (56%) felt that people can 'participate more equally in electronic than in face-to-face communication', and 35% find it 'encourages individual assertiveness'. Both

of these might be taken as indices of the medium's 'empowering' potential. But a high proportion of students (59%) find CMC 'depersonalising ', and consider that 'personal interaction becomes more difficult' (79%).

Table 1: Attitudes Towards CMC (DT200 project questionnaire, 1989, n=789)

Does your own experience generallly support or contradict the following suggestions about computer-mediated communication?

	Agree	Disagree	Uncertain
(i) Individuals can participate more equally in electronic than in face-to-face communication	56%	26%	18%
(ii) Computer communication is depersonalising	59%	24%	17%
(iii) Computer conferencing encourages individual assertiveness	35%	32%	33%
(iv) Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback	79%	10%	11%

However, as with the tutors, a significant minority of students have developed very positive attitudes towards CMC along a number of dimensions (again, see Table 1), and have become heavy users of CoSy. In 1989, for example, 13% of the 787 students who uploaded their project questionnaire data say that they use CoSy often for contacting other students, and 12% said they would be 'very enthusiastic' about continuing to use CoSy after the end of the course, provided they had the necessary equipment (whilst 46% said they would be 'quite interested'). Many of the enthusiasts have obtained their own modems and joined the increasing number of DT200 'alumni'. Amongst the keenest users of CoSy in 1988 was a student who set up an electronic newsletter, with contributions from staff, tutors, and other students. This particular student claims that *" the system is a marvellous socialising medium, and many of these (online) friendships are followed up offline...it provides a real feeling of involvement and ...creates a unique electronic campus with much of the variety of the real thing"* (Malone, 1989). Another regular user, a disabled housebound student unable to attend face-to-face tutorials, has said that ..*"the sort of contact available via CoSy has made me feel part of a real university for the first time"*(4) ; this student set up and ran a 'chatline' for other students which became one of the liveliest and most interesting sites of social discourse on the system

during 1988. Other students set up electronic self-help groups on CoSy, using the private conversation facility, for exchanging views on the course materials, and providing each other with advice on the practical work and assignments. Yet others gave valuable advice on problems with software and practical work in the national course conferences on CoSy (the *practical* and *gremlins* topics in the national *forum* conference in 1988 together attracted 950 messages, the majority from students).

In general, it seems clear that a significant minority of students taking DT200 felt that CMC has given them an enhanced opportunity to contribute and share their own ideas and experiences in a dynamic way. Many of the students had specialist knowledge of particular areas covered in the course, because of their work background (eg as British Telecom engineers, computer programmers and systems analysts, office managers, other IT professionals), and their contributions were often highly valued and relevant. Students who had previously studied the Social Sciences Foundation Course were able to help technology-oriented students with problems over social science concepts and jargon, and *vice versa*. Without CoSy, much of this sharing and exchange would have been impossible. At the level of interpersonal contact and mutual support, a significant minority of students used CoSy and the potential of computer networking to make serendipitous encounters with other students and tutors outside their own restricted tutorial group, and thus vastly broaden their range of social contacts .

Conclusions

At the beginning of this chapter it was suggested that CMC might help remedy two of the major drawbacks of multi-media distance education courses for mass audiences - namely the 'inert' nature of the pre-packaged course materials, often designed for repeated presentations over several years, and the paucity of opportunities for interactive discussion and collaboration amongst and between students and tutors.

The experience of using CMC over a two year period in adjunct mode on the DT200 course at the Open University has certainly demonstrated that it is possible to introduce up-dating material, and items of topical interest into a course through CMC, and, moreover, that this can be done by students and tutors just as well as by the central course team. Topics in both the national *forum* conference, and in the regional conferences, often included references to, and citations from, newspaper, magazine, and journal articles, as well as TV programmes, relevant to themes then being discussed in the course. And course team members responsible for the writing of particular blocks and units often use the national conferences to update their material. Likewise, CMC provides the *opportunity* for students and tutors to interact with each other on a scale which would be quite impossible in a conventional Open

University course.

However, it is also clear that the a large proportion of students and tutors on the course did not play an active part in taking advantage of these opportunities - other than by reading messages posted by others in the local, regional, and national conferences. Furthermore, course team members are reluctant to make a major use of CMC for updating and complementing the printed and broadcast course materials, as this will be perceived as increasing the students' workload (yet more material to read) as well as increasing the cost of the course to students (through increased connect time charges). Any updated or revised material considered to be *essential* is printed and sent through the post, so that all students will receive it, not just those who use CoSy regularly.

In terms of the use of CMC as an object of study - an example of IT in action - the application on DT200 was certainly a success. Contrary to early expectations, students and tutors experienced few major technical difficulties in using a modem and comms software to connect to the University network (once they had got over the initial hurdles). It has proved possible for large numbers to learn how to use email and conferencing successfully, at a distance, by following the instructions and exercises included in the print and audiocassette course materials, and by using the menu-driven front-end provided as part of the course software. For example, 95% of students said they felt comfortable about sending email messages, and 86% comfortable about contributing messages to a conference, after using the system 10 times or less. It should be noted that, in the great majority of cases, this rapid mastery of the basic repertoire of skills needed to use CoSy was achieved with little or no face-to-face training (5).

However, it is clear that the full potential of CMC as a medium for educational communication and collaboration in the distance learning environment has not been realised on DT200, and indeed, could not be, given the marginal and ambiguous role which is assigned to it on the course. A case - and a strong one - can be made for using CMC in adjunct mode on traditional multi-media OU courses for particular groups of students (the housebound, those unable to attend tutorials, overseas students, certain categories of disabled students), and for those who are enthusiastic about the medium, and want to use it as an optional facility for networking and for running online self-help groups. However, the realisation of the full educational potential of CMC in the Open University context would require the development of a new type of course design, with less emphasis being place on pre-packaged materials, and more emphasis on the role of the tutor and on the contributions which students can make from their own knowledge and experience. Such a model would be very appropriate for many of the low population third and fourth-level specialist courses in the

undergraduate programme, as well as for post-experience and post-graduate courses.

Any widespread application within the Open University programme of a course design built around the model of an 'electronic seminar', with opportunities for extended discussion and collaborative work would, however, require certain technological and economic developments. At the very minimum, the University would need to provide local call access to its network from anywhere in the country: at the moment, the cost of such a facility in the UK is prohibitive. Secondly, the University would need to pay tutors more for the increased time they would be spending on their work, both online and off-line: CMC is a labour-intensive medium, and realisation of its full potential would mean a shift of financial resources from course production to course presentation. Thirdly, it would be highly desirable for students and tutors to have a home workstation which would combine CMC transparently with a number of other computer-based tools (graphics, an ideas processor, a word-processor, course-based teaching software etc) and which would also contain software for local selection, organisation, and retrieval of relevant material downloaded from the conferencing system. This, although it has major cost implications, would go a long way towards dealing with the complaints made by many students and tutors on DT200 about the difficulty of locating personally useful and relevant information in the course conferences. An operational design for such a workstation tailored to the needs of distance learners (a 'Thought Box') has been developed at the Open University (Alexander and Lincoln, 1989).

In the final analysis, the issue of the future development of CMC in a mass distance education institution such as the Open University comes down to one of cost. The cost structure of the Open University, which enables it to produce graduates at about one-half of the cost per graduate of a traditional place-based institution (Perry, 1976, p239), is based on the amortisation of high course devlopment costs over large numbers of students, with repeated presentations of courses which, as far as is possible, have a standard structure and format (Rumble, 1988). The introduction of different course models, especially if they offer choices to students and tutors in the media used, will inevitably push unit costs upwards.

Experience with the use of CMC at the Open University so far suggests, not surprisingly, that there are wide variations in preferences for this medium - some students and tutors want to use conferencing actively, and feel that it has 'empowered' them, and brought a qualitatively new dimension into their experience of distance learning and teaching. At the other end of the spectrum are those students who are neutral or disinterested in CMC, and are quite happy to study essentially on their own, with little recourse to other students and their tutor: their approach tends to be highly instrumental, and

heavily grade-oriented. The major challenge for the future development of mass distance education institutions will be to find ways of benefitting from the new communications technologies which will not only provide a diversity of course models to satisfy differing student requirements, but will also maintain costs at a viable level.

Notes

(1) To give an idea of the scale of the course production operation, the DT200 materials include:
- 28 printed self-study units, each ranging in length from 32 to 92 pages, and written entirely by the course team
- a course reader of over 300 pages, containing articles selected by the course team,
- 16 TV programmes, 8 radio programmes, and several hours of audio-cassette material, again all originated by the course team
- many printed supplementary materials (course guide, broadcast notes, project notes, assignments, tutor notes, examination questions and marking guides etc)
- 4 commercial software packages, on floppy disks, plus their reference manuals
- a menu-driven front end to CoSy, on disk, developed by the course team
- software on the VAX cluster, including modifications to CoSy, a course 'shell', and a central data-base, for students to upload and download data needed for their course project.
- a modem, selected after public tender, and specially modified for use on the course (students are expected to obtain their own PC's and printers, either by purchase, or through a rental scheme operated under contract to the University).

(2) See Kaye A., Mason R., and Harasim, L (1989) for a discussion and analysis of the use of computer conferencing for academic collaboration and administration

(3) DT200 is composed of seven 'blocks' of course material, each representing about one month's work for the students. Each block includes a social science strand, a technology strand, an application strand, and a practical work strand. Five main application areas are covered in Blocks 2-6: IT (Information Technology) in the home; in banking, finance, and retailing; in education and training; in manufacturing; and in government. Blocks 1 and 7 are, respectively, an introduction to the course ('Technolgy, people, and issues') and a conclusion.
The course materials for each block include self-study texts, articles from the course reader (*Information Technology: Social Issues*), television programmes, audio-cassettes, computer software, and course assignments.

(4) See message no 5 in the Prologue to Mason and Kaye (eds) (1989)

(5) Some tutors and staff tutors do organise a short 'hands on' induction session at the beginning of the course for those in difficulty, but the great majority of students learn how to use CoSy on their own, at home.

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